

Claims

1. A switch for selectively connecting at least one of a plurality of inputs to a predetermined output, the switch comprising:
 - 5 a plurality of high frequency lines for high-frequency connecting each input to the output;
 - a switching circuit provided in each high frequency line for selectively blocking, line by line, the high-frequency connection; and
 - 10 a drive circuit for driving the switching circuit, wherein a plurality of switching circuits are provided on at least one of the plurality of high frequency lines, and the drive circuit is provided for each switching circuit.
- 15 2. A switch according to Claim 1, wherein the switching circuit comprises a semiconductor element for conducting or blocking in response to a bias voltage, and the drive circuit applies the bias voltage to the semiconductor element in the corresponding switching circuit.
- 20 3. A switch according to Claim 2, wherein the drive circuit determines a bias condition of the semiconductor element in the corresponding switching circuit based on an output voltage or current of the drive circuit, and
- 25 occurrence of abnormality in the drive circuit or in the semiconductor element is detected based on a result of the determination.
4. A switch according to Claim 2, wherein

each of the switching circuits is either:

a series circuit in which the semiconductor element is inserted on a central conductor of the corresponding high frequency line such that, when the semiconductor element is conductive, the transmission through the high frequency line is allowed and when
5 the semiconductor element is not conductive, the transmission is blocked, or

a shunt circuit in which a semiconductor element is inserted between the central conductor and a grounding conductor of the
10 corresponding high frequency line such that, when the semiconductor element is conductive, the transmission through the high frequency line is blocked and when the semiconductor element is not conductive, the transmission is allowed.

15 5. A switch according to Claim 4, wherein

at least one of the switching circuits is the shunt circuit.

6. A switch according to Claim 5, wherein

the shunt circuit has an automatic overheating detachment
20 component which, when a component of the shunt circuit is excessively heated, detaches the shunt circuit or the heated component from the central conductor of the corresponding high frequency line.

7. A switch according to Claim 6, wherein

25 the automatic overheating detachment component is a component having a cushioning characteristic such as a thermal fuse.

8. A switch according to Claim 5, wherein

the shunt circuit has a capacitor which blocks a direct current

to prevent appearance of the bias voltage on the central conductor and grounding conductor of the corresponding high frequency line.

9. A switch according to Claim 5, wherein

5 in at least one of the plurality of high frequency circuits, a plurality of shunt circuits are provided at a same position on the high frequency line as the switching circuits in parallel to each other.

10 10. A switch according to Claim 5, wherein

 in at least one of the plurality of high frequency lines, shunt circuits are provided at different positions on the high frequency line as the switching circuits.

15 11. A switch according to Claim 10, wherein

 a line portion having an electrical length of an odd number multiple of $\lambda/4$ is provided as a part of the high frequency line between the positions at which the plurality of shunt circuits are provided on the same high frequency line, wherein λ is a carrier
20 wavelength of a signal transmitting through the high frequency line.

12. A switch according to Claim 4, wherein

 at least one of the plurality of high frequency lines comprises two terminal-side line portions respectively extending from the
25 input and from the output, the terminal-side line portion having an electrical length of a natural number multiple of $\lambda/2$ where λ is a carrier wavelength of a signal transmitting through the high frequency line, and a switching circuit-side line portion for connecting between the terminal-side line portions;

one or more of the switching circuits are provided on the switching circuit-side line portion; and

a line portion having an electrical length of an odd number multiple of $\lambda/4$ is provided as a part of the switching circuit-side line portion between a switching circuit, among the switching circuits provided on the switching circuit-side line portions, which is the closest to the terminal-side line portion and the terminal-side line portion.

10 13. A switch according to Claim 12, wherein

the switching circuit-side line portion is a rigid line portion which is provided to be detachable from the terminal-side line portion and having a shape which can hold or pinch, and forms a U-link which is a unit for storing the switching circuit or the drive circuit
15 along with the switching circuit.

14. A switch according to Claim 13, wherein

the switching circuit to be stored within the U-link is a shunt circuit and the shunt circuit comprises a capacitor for blocking
20 direct current in order to prevent appearance, on a housing of the U-link, of the bias voltage to be applied to the semiconductor element of the shunt circuit.

15. A switch according to Claim 13, wherein

25 a switch is provided on a panel to which the U-link is provided to detect that the U-link is detached or is about to be detached from the panel.

16. A usage of a switch according to Claim 13, wherein

a non-element U-link is prepared which is a line portion unit which can be mounted, in place of the U-link, on the panel to which the U-link is to be provided and which has no switching circuit therein; and

5 the non-element U-link is used instead of the U-link as necessary.

17. A switch for selectively connecting at least one of a plurality of inputs to a predetermined output, the switch comprising:

10 a plurality of high frequency lines for high-frequency connecting each of the inputs and the output;

 a switching circuit provided for each of the high frequency lines for selectively blocking, line-by-line, the high-frequency connection; and

15 a drive circuit for driving the switching circuit, wherein each switching circuit comprises a semiconductor element for conducting or blocking in response to a bias voltage,

 the drive circuit is a circuit for applying the bias voltage to the semiconductor element in the corresponding switching circuit,

20 at least one switching circuit among the switching circuits is a series circuit in which the semiconductor element is inserted in a central conductor of the corresponding high frequency line such that, when the semiconductor element is conductive, transmission through the high frequency line is allowed and when
25 the semiconductor element is not conductive, the transmission is blocked, and the other switching circuits are shunt circuits in which the semiconductor element is inserted between the central conductor and a grounding conductor of the corresponding high frequency line such that, when the semiconductor element is

conductive, the transmission through the high frequency line is blocked and when the semiconductor element is not conductive, the transmission is allowed;

5 a series circuit is provided as the switching circuit in one or more of the plurality of high frequency lines connected to the same input or output and a shunt circuit is provided as the switching element in each of the remaining high frequency lines;

a drive circuit is provided corresponding to the series circuit and a bias voltage supply route from the drive circuit to the shunt circuit is provided corresponding to the shunt circuit; and

10 a capacitor for direct-current blocking the input or the output with respect to the drive circuit is provided in the input, in the output, or on the high frequency circuit, in order to cause a line portion, among the plurality of high frequency lines, from a series circuit provision position to a shunt circuit provision position, to function as the bias voltage supply route from the drive circuit provided corresponding to the series circuit to the shunt circuit.

18. A switch for selectively connecting at least one of a plurality of inputs to a predetermined output, the switch comprising:

a plurality of high frequency lines for high-frequency connecting each of the inputs and the output;

25 a switching circuit provided for each of the high frequency lines for selectively blocking, line-by-line, the high-frequency connection; and

a drive circuit for driving the switching circuit, wherein the switching circuit has a semiconductor element which conducts or blocks in response to a bias voltage;

the drive circuit is a circuit for applying the bias voltage

to the semiconductor element in the corresponding switching circuit;

at least one of the switching circuits is a shunt circuit in which the semiconductor element is inserted between a central conductor and a grounding conductor of the corresponding high frequency circuit such that, when the semiconductor element is conductive, a transmission through the high frequency line is blocked and when the semiconductor is non conductive, the transmission is allowed; and

a line portion on the high frequency line which includes a shunt circuit provision position, extends on a side of the input and a side of the output of the shunt circuit provision position and has an electrical length of a natural number multiple of $\lambda/2$ is a line portion having a lower intrinsic impedance compared to line portions on the side of the input and on the side of the output seen from the line portion, wherein λ is a carrier wavelength of a signal transmitting through the high frequency line.

19. A switch according to Claim 18, wherein

a plurality of switching circuits are provided in at least one of the plurality of high frequency lines, and

the drive circuit is provided for each switching circuit.

20. A switch according to Claim 2, wherein

the semiconductor element in the switching circuit is a semiconductor element which conducts or blocks by switching of forward bias and reverse bias, and

means for controlling a bias voltage or a current to temporarily increase or decrease in order to shorten the time required for switching when the bias for the semiconductor element is switched

between forward and reverse is provided attached to or within the drive circuit.

21. A switch according to Claim 17, wherein

5 the semiconductor element in the switching circuit is a semiconductor element which conducts or blocks by switching of forward bias and reverse bias, and

 means for controlling a bias voltage or a current to temporarily increase or decrease in order to shorten the time required for
10 switching when the bias for the semiconductor element is switched between forward and reverse is provided attached to or within the drive circuit.

22. A switch according to Claim 18, wherein

15 the semiconductor element in the switching circuit is a semiconductor element which conducts or blocks by switching of forward bias and reverse bias, and

 means for controlling a bias voltage or a current to temporarily increase or decrease in order to shorten the time required for
20 switching when the bias for the semiconductor element is switched between forward and reverse is provided attached to or within the drive circuit.